Kubernetes

- **Kubernetes is an open-source container orchestration tool for automating deployment, scaling, and management of containerized applications.**
- **K8S Maintains and monitors the containers and Performs container-oriented networking**

Features:

1. Auto scaling
2. Self-healing
3. Automatic rollout and rollback
4. Horizontal scaling and load balancing
5. Service discovery and Load balancing
6. Storage orchestration

- We use Kubernetes for automation of large-scale deployment of Containerized applications.
- It can be used on cloud, on-premise datacentre and hybrid infrastructure.
- In Kubernetes we can create a cluster of servers that are connected to work as a single unit.
- We can deploy a containerized application to all the servers in a cluster without specifying the machine name.
- We have to package applications in such a way that they do not depend on a specific host

KEY-CONCEPTS:

* CAdvisor: Used for monitoring resource usage and performance

* Pod: Group of containers

* Label: Used to identify pods

* Kubelet: Container agents, responsible for maintaining the set of pods

* Proxy: The load balancer for pods, helping in distributing tasks across them

* Etcd: A metadata service

* Replication controller: Manages pod replication

* Scheduler: Used for pod scheduling in worker nodes

* API server: Kubernetes API server

Cluster Formation:

1. Creating a k8s Cluster (control plane and nodes)
2. Deploy an application (Deployment file)
3. Explore application (pods, nodes, troubleshoot with kubectl)
4. Expose application publicly (service, labels)
5. Scale up application (Scaling)
6. Update application (rolling updates and rollout)

|--> master and nodes --> Deployment File --> creating Pods --> creating service to expose application --> scaling application --> rolling updates |